

THE MODEL ENGINEER



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The MODEL ENGINEER

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SMOKE RINGS

Photographic Competition Results

● FOR OUR cover picture this week we have reproduced the winning photograph submitted by Mr. B. A. Read of Streatham. His entry shows the constructor, D. W. Read, putting the finishing touches to a 30 c.c., two-stroke "Atom V" engine designed by Mr. Westbury, which, he states, on a preliminary test reached a speed of 9,500 r.p.m., and will be fitted in a Class "A" hydroplane.

In his picture, Mr. Read has succeeded in capturing that indefinable atmosphere of quiet relaxation, which together with the satisfaction of personal achievement, is the panacea so many are seeking today. It is this quality which makes model engineering as a hobby so thoroughly worth while and refreshing, both mentally and physically.

The second prize of £5 has been won by Mr. J. A. Kay of Greenford, Middlesex, with a photograph of his model triple expansion marine engine which has been entered in the Competition Section of this year's MODEL ENGINEER Exhibition.

The third prize of £3 goes to Mr. H. Bacon of Braithwaite in Cumberland, for a photograph of his compound condensing marine engine.

Mr. E. F. Scott of Bristol wins the fourth prize with a photograph of a synchronous clock enclosed in a "Perspex" case.

Cheques for £10, £5, £3, and £2 have been sent to the above.

Among the many other entries are a number of photographs which will most certainly be of use as cover pictures or illustrations for one or other of our journals, and payment will be made on publication at our usual rates.—P.D.

"M.E." Exhibition—Stop Press

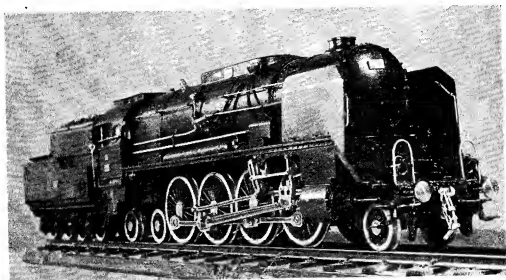
● FROM SPAIN comes the news of some beautifully-executed ship models for display in the international section. These are an eighteenth-century Xebec craft of eighteen guns, square rigged on the main and mizzen masts, and two lateen-rigged model fishing boats. This is our first news of the Spanish entry, and judging by the photographs which accompanied the entry-forms, the quality of the workmanship is unusually fine.

News reaching us from Norway is of further exhibits, namely, a model racing motor-boat which has achieved a speed of 50 miles an hour, a model yacht which has won no fewer than ten prizes in competitions and two model aircraft—one made to 1/36th scale and one to 1/72nd scale.

As we go to press, comes news of yet another five guinea prize. This has been donated by Wing Commander Lewis, to be awarded at the discretion of the judges for the most ingenious model entered in any class of the competition section.—P.D.

An Impressive Austrian Model

● I HAVE already mentioned that the International section of the "M.E." Exhibition will provide much of interest to visitors. As a foretaste, the photograph reproduced on this page shows a striking example of miniature work from Austria. The small electrically-propelled locomotive offers immense scope for the reproduction of minute detail exactly to scale, resulting in the fabrication of precise portraits of the prototypes.



The locomotive illustrated is the work of Mr. Josef Pesout, of Vienna, and is a 1/45 scale reduction of Engine No. 214 of the Austrian State Railways (O.E.B.B.). It is built mainly of brass, has bronze wheels, Alpaka (dural) rods and motion work and is powered by a 20-volt a.c. motor mounted in the "firebox." It required 1,500 hours for its completion. Incidentally, 1/45 scale is the same as our 7-mm. scale which we have standardised for "O"-gauge.—J.N.M.

The Exhibition to be Filmed, Televised and Broadcast

● ALTHOUGH At the time of going to press we have no definite information as to the exact dates and times, it is probable that broadcast descriptions of the "M.E." Exhibition will be heard in the "Eye Witness" and "Radio News Reel" programmes.

Provincial readers who are unable to visit the exhibition, will have an opportunity of seeing pictures of the Exhibition, taken at the Royal Horticultural Hall, in their local cinema news reel.—P.D.

George Stephenson Centenary

● TODAY, AUGUST 12TH, 1948, marks the centenary of the death of George Stephenson, the man whose name commands the respect of all lovers of locomotives and railways. It is well,

therefore, that a little of our space should be devoted to some thoughts on the great man and what he has meant to us all.

He is usually referred to as the "Father of Railways" and, sometimes as the "Inventor of the Steam Locomotive," though the latter is erroneous. The truth is that, due to his foresight and tenacious purpose, railways became, not only possible, but successful as the universal carriers of merchandise and passengers; it is even on record that

George Stephenson clearly visualised the immense importance that railways would have in the general life of mankind and in the rapid development of industry. After the opening of the Canterbury and Whitstable Railway in 1830, George made a remark to the effect that, some day, that railway, the Stockton and Darlington line and the Liverpool and Manchester would be connected by a vast network of railways. The prophecy is obvious to us, but was not generally foreseen one hundred and twenty years ago.

With regard to the steam locomotive, however, George Stephenson was not its inventor and never claimed to be; but he and his son, Robert, put into the *Rocket* of 1829 all the best ideas which their experience and observation could suggest; the result was a locomotive of which all the essential and fundamental features, combined for the first time in the *Rocket*, have remained the broad basis of steam locomotive design ever since.

I need not enlarge upon what all this has meant to the world; but I will add that no other machine yet invented by the human brain has benefited mankind to so great an extent as has the steam locomotive in the form in which George Stephenson left it for his son to develop. Our railways and locomotives bear witness to this fact, and they demand that due honour be paid to the great man who originated them.

—J.N.M.

WHAT TO SEE

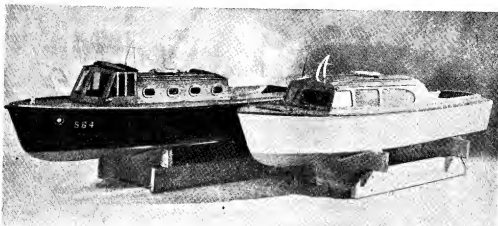
AT THE 1948 "MODEL ENGINEER" EXHIBITION

Some Interesting Trade Exhibits

THE number of firms exhibiting at the exhibition this year is greater than ever and it is expected that the reputation of this exhibition for the unique display of models and accessories, tools and equipment, will be fully maintained. Both the production and development of design of these goods has progressed very rapidly during the past year in spite of the many difficulties which still beset the manufacturing trade. In the following survey, it is

Aero-Spares Ltd., 71, High Holborn, W.C.1.

The conversion and adaptation of surplus war equipment has been the subject of a considerable amount of discussion in the pages of *THE MODEL ENGINEER* during the past year, and the display on this stand will be particularly interesting to all experimenters and constructors of special types of models. Many of the items in surplus apparatus offered by this firm contain



Examples of model craft made from "Adamcraft" kits, typical of all the designs supplied by Adam (New Forest) Ltd.

possible to mention only a few of the interesting items which will be shown at the trade stands.

Adam (New Forest) Ltd.,

Commercial Rd., Totton, Southampton.

The "Adamcraft" constructional kits for model boats are well known to our readers and many new examples of these will be displayed, including small high-speed hydroplanes for use in connection with the new "Jetex" power unit. Another new feature on this stand is a completely new line of electric motors developed specially for use in battery-driven model power boats.

The Admiralty, Chief of Naval Information, Whitehall, S.W.1.

The main feature of this stand will be the display of models, photographs and literature relating to naval matters for the information of prospective recruits and others interested in naval technical activity.

a large number of extremely valuable components, including gears, electric motors, optical equipment and other useful material for the engineering workshop. In particular, mention may be made of items such as bomb sight computers, air position indicators, and automatic pilots and aircraft navigational instruments, all of which have been fully described in the articles on "Swords into Ploughshares" in *THE MODEL ENGINEER*.

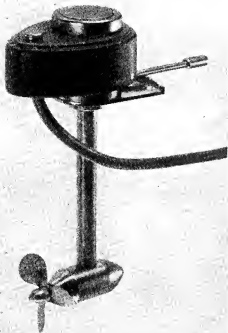
Buck & Ryan Ltd., 310, Euston Road, N.W.1.

This firm is one of the oldest exhibitors at the "M.E." Exhibition, and their perennial display of fine tools and equipment are always one of the most interesting features of the trade stands.

Their usual lines in tools and equipment will be supplemented by many new lines, including the latest types of lathes, drilling machines and various other types of hand- and power-driven machine tools.

Bassett-Lowke Ltd.,
16-20, St. Andrews Street, Northampton.

This firm is also a regular exhibitor at the exhibition and their products are too well known to all readers of our publications to call for detailed comment. Their range of fittings and accessories for scale model railways and locomotives, ships and engines of all types, has been brought fully up-to-date and will be supplemented by a display of photographs, showing special exhibition models which have been produced by this firm.



The new "Foam-Wraith" model electric outboard motor, suitable for small boats—to be seen on the stand of Messrs. Cartwrights Model Supplies Ltd.

Cartwrights Model Supplies Ltd.,
19-21, Elystan Street, S.W.3.

The display on this stand will comprise constructional kits for model railways, ships, aircraft, cars and lorries together with a wide variety of miscellaneous materials and accessories. A special feature is the new "Foam-Wraith" model electric outboard motor which is a faithful representation, on a small scale, of the popular outboard boat motor. It is powered with an "electrotor" miniature motor which runs at over 5,000 r.p.m., driving the propeller through a 3 to 1 reduction gear, housed in a gear case at the end of the driving shaft. The motor runs on either one or two flashlamp batteries, the current consumption of the motor being 0.4 ampere. It is suitable for propelling boats from 12 in. to 24 in. in length. It clamps

on to the transom of the boat in the same way as a full-size outboard motor, and incorporates adjustable steering, also true to type.

Castos, Ltd.

Oakworth, Hadley, Wellington, Salop.

A unique type of constructional set is featured on this stand, based on modern principles of building in reinforced concrete. This opens up many new possibilities in the methods of building attractive architectural models and offers unlimited scope for the design of building structures of every type.

Craftsmanship Models Ltd.,

Norfolk Road Works, Ipswich.

This firm specialises in models which are definitely novel in character, and "off the beaten track." The "Craftsman" twin 10-c.c. horizontally-opposed 2-stroke engine which was shown for the first time at last year's exhibition has been further improved on the Mark II version, and special ignition equipment, either by magneto or dual-spark ignition coil, has been developed for use in connection with this engine. Another interesting petrol engine is the 4-cylinder side-valve water-cooled "Seal" engine in both 15-c.c. and 30-c.c. sizes, and it is hoped to show details of a large radio-controlled sea-going boat incorporating two of these engines. Locomotive engineering will be represented by the unique 1 in. scale model of the 4-8-2 South African locomotive, which is one of the largest and most powerful locomotives ever built to run on a $3\frac{1}{2}$ -ft. gauge track, being over 6 ft. long and weighing approximately 2 cwt. Model steam fittings for locomotives and other types of engines, also a wide variety of other model accessories, will also be shown.

David Curwen Ltd.,

Gore Lane, Baydon, Nr. Marlborough.

This firm has come into prominence in recent years for the construction of large-gauge model locomotives, and will be showing a 10 $\frac{1}{2}$ -in. gauge Atlantic locomotive, specially built for heavy passenger work in public parks and pleasure resorts. In addition, fittings and accessories for locomotives, including many novel items, will be on show on this stand.

T. Garner & Sons Ltd.,

Redbrook Works, Gawber, Barnsley.

The Garner display of tools and equipment at the last two "M.E." Exhibitions has been among the most notable features of the trade stands, and it is expected that the display on this occasion will run true to form. Messrs. Garner make a special feature of Myford lathe service and will be showing examples of the 3 $\frac{1}{2}$ in. M-type lathe, also the ML7 heavy-duty lathe, together with a wide variety of the latest types of hand and machine tools for the model engineer. Another special Garner feature is the supply of castings and parts for the "Ensign" 10-c.c. engine, and it is hoped that these will be supplemented by smaller sets of parts for the "Cadet" 5-c.c. engine. In both engines, die-castings of outstanding quality are employed, and the engines represent the very latest development in the design of small high efficiency engines.

Gordon Green Ltd.,
73, Cowley Road, Uxbridge, Middx.

This stand will feature castings and materials for locomotives, also partly-finished locomotives and marine engines. In addition, a display of machine tools, including the "Keva" lathes, will be shown.

Griffin Industrial Development and Trading Co. Ltd.,

8, Drapers Gardens F.C.2.

An entirely new item of equipment introduced by this firm is the Griffin light alloy bench vice,

Hambling's,
10, Cecil Court, Charing Cross Road, W.C.2.

This firm is well known for model railway equipment in the smaller gauges, and their latest development in this equipment is an entirely new and patented system of two-rail insulated track, using a solid "chair" of the correct type, and the British standard bull-head rail. This is riveted to the plastic sleepers, providing a strong and rigid structure and yet allowing lateral expansion of the rail. Two special tools are provided for assembling this



A 10 1/2-in. gauge "Pacific" type locomotive by Messrs. David Curwen Ltd. A locomotive of this size may be inspected under steam at the Exhibition

which is made in two sizes, 2 1/2 in. and 3 in. width of jaws. This vice has been designed to meet the present shortage of various materials, and it is claimed that it is of equivalent strength to any similar cast-iron vice, while its design is adequate to cope with the highest stresses.

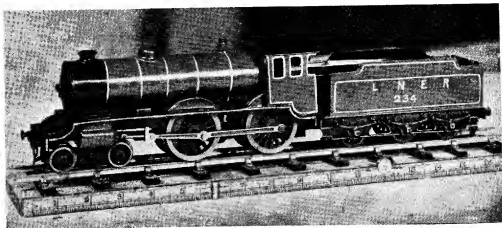
The Grindturn Engineering Co.,
Market Chambers, Market Street,
Shrewsbury.

This firm introduces for the first time, the Grindturn 2-in. centre lathe which is designed primarily for the modelmaker. It embodies the features which are generally accepted as being highly desirable for small precision work, including a bed of ample proportions, spindle bearings of phosphor-bronze, slides fitted with adjustable gib strips, swivelling and removable tool-post and set-over tailstock for taper turning. The lathe has been designed to take standard sizes of chucks and other accessories. All parts are built to standard and are replaceable.

track. A new process has also been developed for the manufacture of insulated driving wheels for locomotives of "OO" gauge operating on the two-rail system; the rim of the wheel is turned in metal and undercut so that when plastic composition is moulded in, it is securely locked to the rim, and relative movement of the two parts is impossible. In the case of locomotive driving wheels, a metal centre is moulded into the wheel and locked by means of an undercut in the same way. The complete working "OO" gauge layout with trains in operation will be featured on this stand.

Douglas C. Howells,
Lushington Lane Works, Eastbourne,
Sussex.

The display on this stand will consist of a complete range of model racing car kits to take power units of 1.3 c.c. to 10 c.c. All accessories for model cars, including flywheels, centrifugal clutch assemblies, chassis frames, gearboxes, wheels and bodies will also be shown.



A completed model locomotive constructed from parts supplied by Messrs. Gordon Green Ltd.

Imperia Co.,

4, Cranbrook Road, Ilford, Essex.

This firm specialises in fittings for model ships and will be showing a selection of their products, including deck ventilators, grills, gratings, ladders, deck fittings and marine boilers.

J's Model Centre,

6, Blenheim Grove, S.E.15.

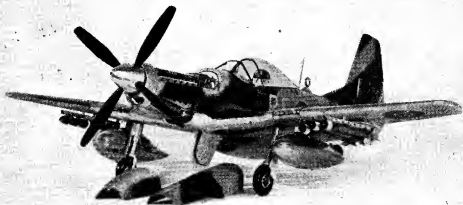
Among the range of model aircraft kits and accessories displayed on this stand, special interest attaches to the kit for the construction of the "Nancy" control-line plane of 18-in. wing span and the slip stream fuel tank. The products shown also include kits for the construction of model galleons, other ship fittings, also kits and accessories for "OO" gauge model railways.

Juneero Ltd.,

Stirling
Herts.

Corner, Boreham Wood,

The well-known Juneero construction outfits will be featured on this stand, including the Juneero bending and shearing and punching tool which is extremely useful for many model engineering operations which involve the use of sheet or strip material. An entirely new accessory which has been developed for use in connection with this tool is the "Xakto" slide gauge and protractor, which can readily be attached to the tool, and provides visual location of exact measurements for all operations. This eliminates the necessity for marking-out the position of holes and bends, enabling a high degree of accuracy to be positively obtained.



This super detail model, in metal, of a "Mustang" will be on show at the stand of The K Model Engineering Co. Ltd.

**The K Model Engineering Co. Ltd.,
Darnley Street, Gravesend, Kent.**

The range of compression ignition engines which is a speciality of this firm has now been augmented by the new K "Hawk" 0.2 engine which weighs only 1 oz., and is claimed to be the world's smallest and lightest engine in this class. Larger engines of 1 c.c. and 5 c.c. are also shown, and kits for constructing aircraft, boats and cars.

**E. Keil & Co. Ltd.,
195, Hackney Road, E.2.**

The well-known Keilcraft kits which are the speciality of this firm will be a prominent feature of this stand, and will be supplemented by a very comprehensive range of accessories for aircraft and model racing cars, including power units of all sizes and types, both petrol and compression ignition. The new low-tension ignition glow-plugs which eliminate the necessity for an ignition coil or any form of electrical equipment to be carried on the car or plane, are shown this year for the first time.

**Kennion Bros. (Hertford) Ltd.,
7, Greenways, Hertford.**

This firm is well known for the wide variety of castings and parts for locomotive construction, and will be featuring parts for the construction of locomotives to "L.B.S.C.'s" designs, including blueprints. They have now introduced a new series of machined cylinder blocks for various types of locomotives to assist constructors with limited equipment; fourteen different types are available up to the present date. Another interesting feature is the range of 40 thread taps and dies to "M.E." standards, and tailstock die-holders for $\frac{1}{8}$ -in. and 1-in. circular dies. A full range of miniature boiler fittings, including pressure-gauges, water-gauges, check-valves, etc., in all gauges from "O" to $7\frac{1}{2}$ in. are offered at little above pre-war prices.

**M. & E. Models Ltd.,
Exmouth, Devon.**

The principal feature of this display will be the selection of goods for the construction of model racing cars, and a full range of component parts and accessories for the same. Other working models will also be featured, including electric motors, steam engines, fittings for ships, and model railways.

**Percival Marshall & Co. Ltd.,
23, Great Queen Street, W.C.2.**

The wide range of P.M. technical books will be featured on these stands including many new publications which have been introduced since last year's exhibition, also blueprints and plans for the construction of all types of models, including many popular designs which have been described in *THE MODEL ENGINEER*, *The Model Railway News*, *Model Car News*, *Model Ships and Power Boats* and *Model Aircraft*.

**Mills Bros. (Model Engineers) Ltd.,
2, Victoria Colonnade, Southampton
Row, W.C.1.**

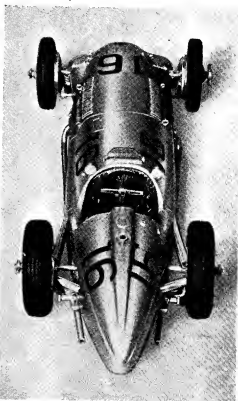
In pre-war exhibitions the stand of this well-known firm was devoted mainly to model railway

equipment, but while this side of the business has still been maintained fully up-to-date, the products of the firm have been greatly extended, and they are now chiefly known in connection with the manufacture of model compression ignition engines. The Mills Mk. II introduced last year will be featured and also a wide range of up-to-date accessories for model aircraft, boats and cars.

Modelcraft Ltd.,

77, Grosvenor Road, S.W.1.

The well-known Modelcraft constructional kits and accessories which cover practically every



A solid scale reproduction of the Grand Prix Mercedes Benz, 1938, one of the models that can be made from kits supplied by Messrs. Modelcraft Ltd.

branch of model engineering, from architectural models to model power boats and aircraft, will be the principal feature of this display. Plans and explanatory books for the construction of these models and many others will also be shown.

Models (City) Ltd.,

2, The Arcade, Liverpool Street, E.C.2.

This stand will feature model railway parts and finished equipment in all gauges from "OO" to 10-in. gauge. Other types of models

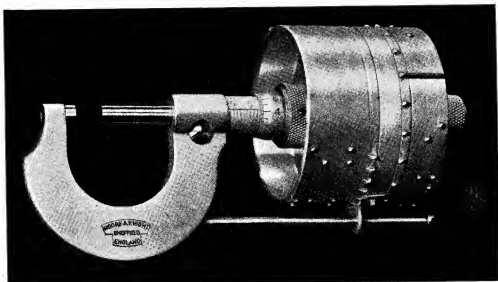
include aircraft kits and accessories, and power units. Among the special features of this year's exhibition are the "T" track components and mechanisms in "O" gauge.

Moore & Wright (Sheffield) Ltd.

14-28, Norton Lane, Meadowhead, Sheffield, 8.

Moore & Wright tools are now so well known as to call for very little comment, and the standard lines produced by this firm will be the main feature of the display. Among new additions to

are featured on this stand, including a wide range of miniature petrol and compression ignition engines of all types. A complete range of control-line accessories has been introduced, including an entirely new design of control handle with means of adjustment for relative lengths of line. Other features include model aircraft working components in laminated plastic material which is stronger and lighter than aluminium, and translucent fuel tubing impervious to all types of fuel and suitable for all small petrol and compression ignition engines.



Tools for the blind.—A micrometer with braille readings to be seen on Messrs. Moore & Wright (Sheffield) Ltd., stand, along with a large display of workshop tools

their range are a spiral ratchet screwdriver, a set of jeweller's screwdrivers, and a new bevel protractor with an acute angle attachment and fine adjustment device. The already wide range of micrometers has been further extended and both micrometers and protractors are now obtainable with braille readings in a form suitable for use by blind technicians.

George Newnes Ltd.,

Tower House, Southampton Street, W.C.2.

The technical publications of this firm embrace a very wide range of subjects, including workshop processes, machine tools, electricity, chemistry and physics. The popular journal *Practical Mechanics* will also be featured and the current issue contains articles on all aspects of science and mechanics including atomic energy, rocket propulsion, television, model engineering and photography.

H. J. Nicholls Ltd.,

308, Holloway Road, N.7.

The most up-to-date developments in model aircraft, model racing cars and other equipment

Precision Accessories Ltd.,

12, Ogle Street, New Cavendish Street, W.1.

Small machine and hand tools and material for model engineering construction are featured in this display, and include many novel and up-to-date lines. Complete stationary steam engines and boilers, also castings and parts for engine construction will also be featured.

Model and Airsports Ltd.,

Hillview Works, East End Road, N.2.

The model aircraft construction kits featured by this firm include a new free-flight contest plane and semi-scale flying model suitable for c.i. engines of 1 to 2 c.c. The engines shown include the "M.E.C." 1.1 c.c. and the "Albion" 2.8-c.c. Kits for the construction of model yachts and power boats will also be featured together with many proprietary kits and accessories.

Prestacon Model Engineering,

31-35, Wilson Street, E.C.2.

The Prestacon constructional outfits which were featured in last year's exhibition will be displayed on this stand, including the Prestacon

press for punching round and square holes, slotting, cutting rectangles, squares and circles, and shearing strip material. Complete kits for the construction of many types of models with the aid of this tool will also be shown together with detailed working drawings.

Scale Models Ltd.,
Brooklands Motor Course, Weybridge,
Surrey.

The main exhibits at this stand are die-cast mechanical and non-mechanical scale model racing cars to a scale of 1/32 in. in complete and kit forms. The main features of these models are



Midget scale racing cars made from parts supplied by Messrs. Scale Models Ltd.

their detachable and semi-interchangeable clockwork mechanism, which is wound from the front by means of a characteristic starting handle, and their accuracy to the scale proportions and detail of the prototype. They have sprung suspension and turned brass wheels, with removable rubber tyres of correct pattern tread, and are made in a large selection of colours, including those used in actual racing.

Shenphone Electrical Products,
226, High Road, Leyton, E.10.

The well-known Shenphone power supply units for model railways, which have been the speciality of this firm for many years, will be the most prominent feature of the display on this stand. They have been brought fully up-to-date with modern requirements and will be supplemented by many new items in electrical apparatus, including transformers of various types, automatic overload circuit-breakers, rheostats and speed controllers.

Signalling Equipment Ltd.,
Merit House, Potters Bar, Middx.

This firm holds a long-standing reputation as manufacturers of toys and models, and in recent years the model side of their production has been very intensively developed. They will be showing a very wide selection of their latest productions in model aircraft, electric motors and steam engines, educational working models and compression ignition engines of 1.5 c.c., 2.15 c.c. and 5 c.c.

Dick Simmonds & Co., Ltd.,
5, South Road, Erith, Kent.

The products of the well-known "backyard foundry" which have often been referred to by our contributor "L.B.S.C." are too well known to our readers to call for detailed description. The display on this stand will feature castings and materials for all types of locomotives, boiler fittings, finished components and castings for constructing stationary engines and other models.

Stewart-Reidpath Ltd.,
Herne, Herne Bay, Kent.

Model railway equipment and accessories

in "OO" gauge will be featured on this stand, including the new "Essar" 12-volt d.c. mechanism for "OO" gauge locomotives and rolling stock.

Spoked wagon and locomotive wheels of correct scale proportions are now marketed by this firm. A further item of the display will be specimens of commercial engineering models of various types.

Stuart Turner Ltd.,
Henley-on-Thames, Oxon.

Although the name of this firm is a household word in model engineering, they have been absent from the last two "M.E." Exhibitions due to difficulties in supplies and readjustment to post-war conditions. We are very pleased to see that they are now making a come-back and have very good reason to believe that their reputation will be still further enhanced by the display of models, castings and model components in wide variety which they will show. The familiar Stuart models, which we have known in the past, will be welcomed back by many constructors and will again be available in either complete form or in parts for construction, also the Stuart centrifugal and reciprocating pumps.

Walkers & Holtzapffel Ltd.,
61, Baker Street, W.1.

Among items in gauge "O" and "OO" model railway equipment produced by this firm, special interest attaches to the Riensdyk "OO" gauge clockwork mechanism, suitable for express and mixed traffic, or goods loco-

motives, which can be supplied either 4-coupled or 6-coupled. Another interesting item is the Romford locomotive mechanism both 4-coupled and 6-coupled with the flywheel drive and the Romford motor bogie, a precision unit suitable for installation into electric outline motor coaches, trains and rail-cars.

**Wilmot, Mansour & Co. Ltd.,
Salisbury Road, Totton, Hants.**

The "Jetex" Miniature jet motors which are the speciality of this firm represent the very latest developments in propulsion units for all types of model aircraft, speedboats and racing cars. In the "Jetex" motor a large volume of gas is generated at a constant rate by a slow-burning gas-producing charge and ejected

through a small nozzle at very high speed, producing a reaction thrust which propels the model in the same manner as the full-size aircraft jet motor. These power units will be demonstrated in action and also in their application to various types of models.

SHOW CASE EXHIBIT

**Pritchard Patent Products Co. Ltd.,
The Court, Russell Street, Sidmouth,**

The main feature of this exhibit is specialised components for "OO" gauge model railways, including disc, Mansell and spoke-type wagon and coach wheels mounted on insulated axles for two-rail supply; also, Peco "Individulay" "true-to-type" track, complete with sleepers, ballast, chairs, etc.

Jig for Drilling Locomotive Axleboxes

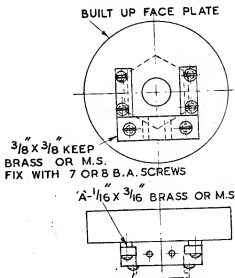
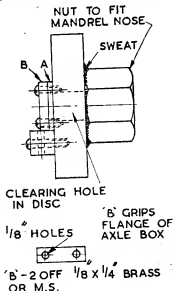
SOME time ago I made a very useful appliance for drilling or boring out model locomotive axleboxes correctly. In my case, the jig was made to suit 2½-in. gauge engines, but the construction could be the same for larger sizes.

I first procured a machined nut to fit the mandrel nose. Upon this a disc of brass 2½ in. diameter was soldered. The face of the disc was turned up and centred, and around this centre was scribed the outline of the slots cut out of the frames to suit commercial horn-blocks. The lines thus scribed were a copy of those on the drawing, the centre on the brass disc being in the same position as that shown in the drawing.

A piece of flat mild-steel ½ in. by ½ in. was then

slightly thinner than the thickness of the axlebox flange and secured to the brass disc with two ¼-in. Whit. screws. Two more pieces of strip were then put on top of the aforesaid, and were of a sufficient width to allow an axlebox to slide down to the keep and were fixed with the two ¼-in. Whitworth cheese-headed screws through both strips and tapped into the disc, or faceplate. When all these screws were screwed up tightly, the axlebox to be drilled was held securely to the disc in what would actually be the running position.

Before attempting to drill an axlebox, a ⅞-in. hole was bored in the disc centrally for drill and reamer clearance.



secured with two screws in the same position as the axlebox keep would be. Two other strips were then secured at each side of the vertical lines of the slot marked, parallel to them but at a distance equal to the depth of the flange of the axlebox. These two pieces of strip were filed

Taking it for granted that all the axleboxes have been made to the same dimensions, it is then only necessary to slip a box into the jig, tighten the ¼-in. screws, run up the Sloccombe centring drill and then drill and ream to the size required without any marking off.—C. V. BAVIN.

A Model General - Service Feed Pump

by R. Johnston

THE photographs show a double-acting general-service pump, which constitutes my first real attempt at constructive model-making.

The model stands 13 in. high, and was built throughout without using castings of any kind.

The columns, piston and rod and valve-gear are made of stainless steel.

The steam cylinder is $1\frac{1}{2}$ in. bore by 2 in. stroke.

The bore of the bottom, or water end of the pump is $1\frac{1}{2}$ in. This, of course, is the bore of the liner which is fitted to this part.

Construction began on the bottom part, and everything went well until a problem arose concerning the column bosses. If made singly, it would be extremely difficult to have the pump lined up perfectly concentric with the steam end.

I overcame this by turning up a large ring-shaped piece of brass, forming a recess to fit

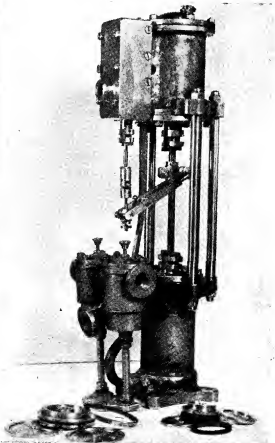
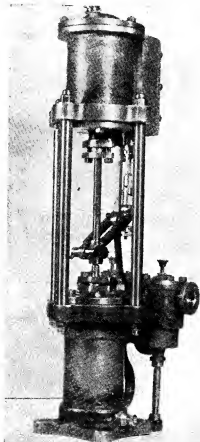
neatly over spigot at top of water chamber. I cut part of this ring away, leaving it somewhat in the shape of the letter "C" and after filing into shape as shown, silver-soldered it in position.

The same method was adopted when making the steam cylinder, afterwards fitting the two parts together by means of a simple jig, and drilling the column holes, thereby ensuring dead true alignment.

The cylinder block was next shaped up and silver-soldered to the steam-chest, and then milling and drilling of the ports was done.

The twin valve-boxes were next turned and fitted together by means of a plain union and T-piece. Great care had to be exercised when marking off the valve-boxes for the union and T-piece, as the smallest error would have led to difficulty in lining up.

(Continued on page 171)



"MAID OF KENT"

Valve-gear for Outside-cylinders

by "L.B.S.C."

"PATIENCE is a virtue; find it if you can—seldom in a woman, never in a man."

So runs the old saw, and I reckon it is about right! Several letters recently to hand remind me of an advertisement often seen in Underground trains before the Kaiser's war. It portrayed a would-be passenger sprinting down the platform like a 100-yd. champion, towards a waiting train, and a porter piling on the agony with an exhortation to "Hurry up, please"; the title was "Urging the Willing Beast"; Well, the "willing beast" who is doing his utmost to keep you supplied with *reliable* instructions and drawings for three serial locomotives, gets plenty of letters from impatient readers who want to know how long it will be before this and that comes out, after the style of the porter in the advertisement mentioned above. As another old saw puts it: "A nod is as good as a wink to a blind horse"—nuffed!

Practically all full-sized engines with outside cylinders having their steam chests between the frames, are fitted with Stephenson link-motion, and so we adopt it. The simple loose eccentric could, of course, be used, and would give good steam distribution; but on an up-and-down line, it would be inconvenient on an engine the size of the "Maid," where constant reversing is required. I have arranged the valve-gear so that it utilises the principal parts of the link-motion already described for the inside-cylinder "Maid," and there won't be any need to describe these parts in full detail again; all I need do, is to run through the gear in brief summary, elaborating a little on differences such as the transmission between die-block and valve-spindle.

Eccentrics and Links

The only difference between the eccentric-shafts and those described for the inside-cylinder engine, is that these have $\frac{1}{8}$ -in. flanges, to prevent the straps slipping off. They will need steel bar or blanks 2 in. diameter, from which to turn them. The straps, rods, expansion-links and die-blocks are exactly similar to those described and illustrated in detail, in the issues for May 20th and 27th last, so please refer back and save needless repetition. Instead of the die-block pin being screwed into the lower end of a rocker, it is carried by a link hanger or suspension-lever, pivoted to the frame; the valve-rod works on the same pin, transmitting the movement direct to the valve-spindle, and cutting down lost motion to the minimum.

The link hanger is built up. Saw and file a piece of $\frac{3}{8}$ -in. by $\frac{1}{2}$ -in. steel, to the shape shown, and drill a No. 27 hole at each end.

For the boss, chuck a bit of $\frac{1}{4}$ -in. round steel or good bronze rod in the three-jaw, turn a $\frac{1}{8}$ -in. pip on the end to a tight squeeze fit in the hole in the larger end of the link hanger, and part off $\frac{1}{2}$ in. from the shoulder. Squeeze it in, and if steel, braze it; if bronze, silver-solder it. Grip the boss in the three-jaw, centre, drill $15/64$ in. or letter C, and ream $\frac{1}{4}$ in. Pin-drill a $\frac{1}{8}$ -in. recess $3/32$ in. deep in the face, as shown in section. The pins are simple turning jobs needing no detailing; silver-steel gives the longest wear, but mild-steel will do quite well, as neither pin has to stand a fraction of the stresses that send crankpins prematurely to the scrap heap. Be sure to have the working surfaces perfectly smooth, no ridges or tool-marks; fit the bigger pin to the boss of the link hanger, and the smaller one to the hole in the die-block, which does not need counter-boring.

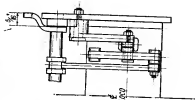
Valve-rods and Weighbar-shaft

The valve-rods are sawn and filed, or milled, from $\frac{1}{2}$ -in. by $\frac{1}{8}$ -in. mild-steel, to shape and dimensions shown in the illustration. Drill both bosses $7/32$ in., and fit bronze bushes reamed $5/32$ in. after they are squeezed in.

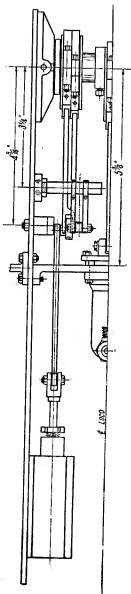
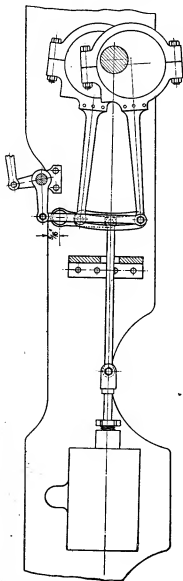
The only difference in the weighbar or reversing shaft, is that it has four lifting-arms instead of two. These are milled, or sawn and filed, from $\frac{1}{2}$ -in. by $\frac{1}{4}$ -in. mild-steel, the bigger ends being reamed by using the "lead" end of a $\frac{1}{8}$ -in. parallel reamer, and only entering it sufficiently to enable the lifting-arms to fit very tightly on the $\frac{1}{8}$ -in. shaft. Drive them all on in the positions shown, and put a piece of $5/32$ -in. silver-steel through all four holes in the smaller ends at once, to line them up. Leave it in whilst brazing the arms to the shaft. The reverse-arm is made same as previously described, and brazed on at the same heat. The brackets are also the same, ditto their position on the main frames. The lifting-links have bosses $\frac{1}{8}$ in. thick, otherwise they are the same as described for the inside-cylinder job.

Motion-plate

The motion-plate is simply a plain stay with flanges at each end, and can either be cast, or made from plate material—in which case $\frac{1}{2}$ in. would be stout enough—with a piece of $\frac{3}{8}$ -in. by $\frac{1}{2}$ -in. brass angle riveted on at each end, for attachment to frames. The sides of a cast plate are machined off exactly the same as those previously described. A 1 in. hole is drilled on the vertical centre-line $1\frac{1}{2}$ in. from the top, to accommodate the pump-barrel; and a rectangular hole, $\frac{1}{2}$ in. by $\frac{3}{8}$ in., at $\frac{1}{2}$ in. from each side, and level with the round hole, is cut in the plate to allow the valve-rods to pass



Link motion for
outside-cylinder
"Maid of Kent"



through it. The motion-plate is erected, flanges pointing towards the front of the engine, with the plain side $5\frac{1}{8}$ in. ahead of the centre of the driving axle, the bottom of the plate being $\frac{1}{8}$ in. above the bottom edge of the frame. After you have located it correctly, and drilled and tapped the flanges, take it out again and fix the pump to it before erecting "for keeps."

Boiler Feed-pump

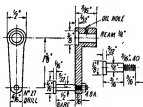
The feed-pump is made up as described for the engine with inside cylinders and link-motion, with two minor differences, both shown in the accompanying illustration. Instead of the valve-box being extended upwards to go between the inside guide-bars, it is cut short, only extending $\frac{1}{2}$ in. above the centre-line of the pump-barrel. The chamber for the delivery-valve is made $15/32$ in. deep, so that the valve-seat is not too close to the hole in which the anti-airlock pin works; see the "broken-away" view.

Instead of the side "wings," a square flange $1\frac{1}{2}$ in. across, is made from $\frac{1}{8}$ -in. brass plate, drilled a tight fit for the stuffing-box end of the pump barrel, and silver-soldered to it $\frac{1}{2}$ in. from the end. A No. 30 hole is drilled in each corner. The barrel is then inserted in the hole in the motion-plate, from the flange side, and secured by four $\frac{1}{8}$ -in. or 5-B.A. screws going through the corner holes into tapped holes in the motion-plate. Take care that the valve-box is vertical! The gland is exactly as described for the other engines, of the oval, studded pattern, the bronze studs being screwed into the motion-plate, located from the holes in the gland according to directions already given. Use brass nuts as before, no need to repeat why. The motion-plate, with pump complete, can then be re-erected in the frames, and the eccentric-strap and rod fitted.

These are the same as on the inside-cylinder Joy-gear engines, except that the exact length of the eccentric-rod is obtained from the actual job by the process already described.

How to Erect the Valve-gear

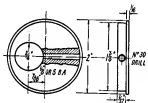
First of all, fit the link hangers or suspension levers. At $4\frac{1}{8}$ in. ahead of the vertical centre-line of the driving-axle, and $\frac{5}{16}$ in. below the top of the frame at this point, drill a $\frac{3}{8}$ in. clearing hole (No. 12 drill). Poke the $\frac{1}{4}$ -in. pins through



Link hanger or suspension lever



Valve-rod



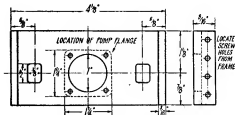
Eccentric

the link-hanger bosses, and put the screwed part through the frame, securing with a nut. The hanger should swing quite freely without being slack; though slackness here would not affect the valve-setting, it isn't good workmanship!

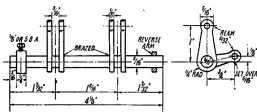
Now put the eccentric-rods and expansion-links together just as I described for the inside-cylinder engine, pinning the eccentric-rods to the links, and attaching the lifting-link to the lower pin in the slotted link; but note one difference: As the lifting-links are separated in this engine, and not rubbing shoulders and forming a column of mutual support, in a manner of speaking, like they do on the inside-cylinder job, the bottom pin is extended for $\frac{3}{8}$ in. beyond the lifting-link, reduced, screwed $\frac{1}{8}$ in. or 5-B.A., and fitted with a nut and washer to prevent the boss of the lifting-link slipping off. This is clearly shown in the end view. The lifting-links must also be quite free but not slack. Swing it clear, put the die-block on the long-headed $5/32$ -in. pin, poke it through the slot in the expansion-link, put on a distance-piece or spacer washer made of $\frac{1}{8}$ -in. bronze rod, $5/32$ in. thick, and drilled No. 21, then one end of the

valve-rod. Take off the plain halves of the eccentric straps, then drop the whole issue into place, putting the loose end of the valve-rod through the hole in the motion-plate, guiding the half-straps on to their proper eccentrics, and finally entering the end of the die-block pin into the hole in the bottom of the link hanger, and nutting it at back of same.

If you have any trouble in getting the nut on in position, simply remove the hanger by undoing the nut outside the frame, and taking it out



Motion plate or pump stay



Weighbar shaft

complete. The die-block pin can then be attached whilst the whole lot is out, the complete unit being afterwards dropped into place as mentioned above, the hanger pin replaced, the eccentric-straps put on, and the valve-rod attached to the valve-fork or crosshead by a $5/32$ -in. silver-steel pin reduced at each end and nutted, as described for the inside-cylinder valve-forks.

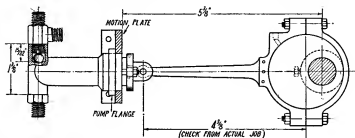
The weighbar-shaft is then erected exactly as described for the inside-cylinder engines, $3\frac{1}{8}$ in. ahead of the vertical centre-line of the driving-axle, and $1\frac{1}{8}$ in. above the centre-line of motion. The upper end of each lifting-link is placed between the corresponding two lifting-arms, and fixed with a pin made by turning down each end of a $\frac{1}{8}$ -in. length of $5/32$ -in. round silver-steel to $\frac{1}{8}$ in. diameter, screwing $\frac{1}{8}$ in. or 5-B.A., and fitting ordinary commercial nuts. The plain part should be a full $7/16$ in. long, so that the pin can be turned with your fingers when the nuts are screwed right home. Give all the joints a drop of oil, and the gear should reverse easily, with no sign of sticking or binding, with the cranks in any position. I've seen more than one engine which would only reverse with the cranks in one position, and the good folk who built

them were among the fraternity who reckoned they "knew all the answers!"

How to Set the Valves

I forgot to mention, when on the subject of erecting the motion-plate, that four of the screws holding the guide-bar brackets or yokes can be made to do double duty by going right through the frame, and screwing into the tapped holes in the side flanges of the motion-plate. This

eccentric strap, and hold the front half (which is attached to the rod) against the eccentric tumbler whilst I make the adjustment. The set-screw is tightened just sufficiently, during this operation, to prevent the eccentric moving on its own, but not enough to prevent it being turned with finger and thumb. When the valve is set correctly, the set-screw is tightened, and the half strap replaced. Check on both dead centres; if one cracks and the other doesn't,



Feed pump



Lifting links

whzeeze is shown in the plan view of the whole outfit.

The valves may be set either by sight as described for the inside-cylinder engines, or under pressure. For the former, take off the steam-chest cover, and with the eccentrics in any position on the axle, turn the wheels and watch the valve. If it doesn't open the ports an equal amount at each end of the movement, adjust the valve-fork on the spindle until it does. Then set the crank on front dead centre, and turn the fore-gear eccentric in a forward direction until the port just cracks. I can hear some new beginners saying, how do we see the crank with the chassis lying on its side, and how do we turn the eccentric when the set-screw is covered by the strap. Well, the most mystifying conjuring act is simplicity itself when you know how it is done. What I do, is to hold one end of the buffer-beam in a machine-vice on the bench, which raises the chassis high enough to allow a mirror to be put under it, and you can see the crank as easily in the mirror, as you could direct. Then I just take off the back part of the

the valve is a shade too long; file a little off both laps, to keep the cavity central, and have another shot.

The back-gear eccentrics are set in exactly the same way, putting the crank on dead centres, and turning the back-gear eccentric backwards until the port cracks. To set the valves under pressure take off the connecting-rod, apply air pressure to the steam chest by means of a tyre-pump or any other convenient way, and adjust the valve-fork on the spindle until the piston-rod shoots out at front dead centre, and back at the other, when the wheels are turned by hand. If the piston-rod shoots out on front dead centre, but doesn't go back until after the crank has passed the other, the valve is too long; remedy as above. When the ports crack on all dead centres in both directions, or the piston-rods shoot in and out on the dead centres, whichever way the reversing arm inclines, the valve setting is all correct, and the engine will do lots of work on little steam. Next items, cab lever, steam and exhaust pipes, and mechanical lubricator.

A Model General-Service Feed Pump

(Continued from page 167)

The valve-boxes were each mounted, in turn, in the four-jaw chuck, and side holes drilled and tooled out.

The piping connection holes and discharge flange connections were done in the same manner.

Needless to say, the making of the valve-boxes represented quite a ticklish piece of work, but I thoroughly enjoyed it.

The seats are of the usual feed-pump type, a small thin plate covering the holes, and on top

of this, a valve-guard and light spring are fitted.

The bucket, which is of gunmetal, was made in three parts, with two split ebonite rings in the grooves provided. I made the piston in the same manner, recessed out in the centre-piece to reduce weight.

However, a three-part piston is not really necessary.

The bucket and piston are both shown in one of the photographs.

IN THE WORKSHOP

by "Duplex"

17—Drilling Machine Depth-Stops and Gauges

IT is a great advantage in many forms of work to be able to drill a single or a series of holes to an exact depth, both when it is necessary to avoid the drill breaking through the material and also to ensure uniformity of machining.

Depth-Stop

The simplest type of depth-stop consists of a collar secured to the spindle of the drilling

machine of the drill is almost essential in order to avoid the laborious procedure of repeatedly measuring the depth of the hole until the correct result has been obtained.

A simple form of depthing-gauge fitted to a quill-type of drilling machine is shown in Fig. 3. Here, a portion of a rule is held in the split of the quill-housing, and readings are taken either from the upper edge of the quill itself

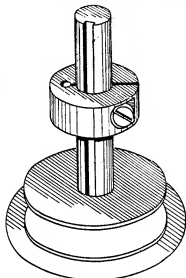


Fig. 1

machine; when this collar comes into contact with the driving pulley or the upper surface of the bearing-lug, the downward travel of the drill is arrested at this point.

A stop of this form is illustrated in Fig. 1, whilst in Fig. 2 another pattern is shown which obtains a firm hold by means of a locking-screw clamping a pad in the keyway of the drill spindle.

The latter form is used when the drill spindle is driven by a bevel pinion; the tail of the clamping-pad then engages the driving-key of the pinion, whilst the collar itself remains clear of the pinion teeth.

It should be emphasised that the stop-collar must always be firmly secured, otherwise at the end of the drill's travel it may be displaced by the leverage of the machine's feed gear.

Depth-Gauge

When setting the depthing-stop, or when drilling to an exact depth without using the stop, some means of measuring the depth of penetration

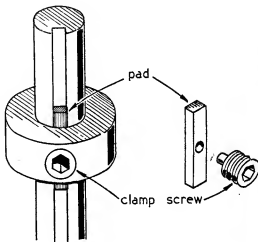


Fig. 2

or from a reference line inscribed on the quill.

If a small leaf-spring is fitted behind the rule in the slot, the rule can be adjusted to set it to the zero position and, at the same time, the spring friction will retain the scale in place.

Combined Depthing-Gauge and Stop

In some makes of drilling machines a simple device is incorporated which serves the double purpose of acting both as a depth-stop and as a graduated gauge for setting the stop or determining the depth of drilling.

This design is illustrated in Fig. 4, where it will be seen that a graduated pillar is fitted to the flange at the lower end of the quill. This pillar carries a threaded finger-nut which, when it comes in contact with the lug projecting from the quill-housing, prevents further downward movement of the drill.

In the commercial type of machine illustrated, the designing of an efficient drilling stop and gauge is not a difficult matter, but in the case of the

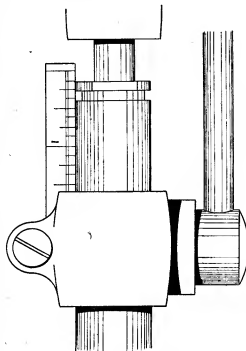


Fig. 3

small sensitive drilling machine, where the spindle runs directly in the bearing lugs, the provision of such a device is rather less straightforward.

The Device Fitted to "The Model Engineer" Drilling Machine

After constructing "The Model Engineer" drilling machine, referred to in previous articles, it was soon realised that its general usefulness was somewhat restricted by the lack of a depthing-gauge and stop; in fact, the larger drilling machine was more often used, as it was fully equipped in this respect.

It so happened that some accurate depth drilling of very small holes had to be undertaken, so there was nothing for it but to fit the small high-speed machine with a device suitable for this purpose.

To make the following description intelligible, a general view of the upper part of the machine, showing the fitting in place, is given in Fig. 5.

The open type of cradle used for the feed gear is that described in previous articles; this form of construction, which is part of both the original and the modified design, greatly facilitates the fitting of the depthing-stop.

Needless to say, when designing a mechanism of this sort, where dimensions in different planes have to be determined and the relationship of the parts varies with the movements of the feed gear, it is essential, if mistakes are to be avoided, to lay out the whole mechanism in detail on the drawing board, using a scale of two or more times the full size.

The general construction is that the pillar *A*, screwed into the head of the machine, carries a finger-nut *B* with which the stop members *C* come in contact to limit the downward travel of the spindle.

The depthing-gauge comprises an angular bracket *D*, secured to the pillar *A* by a locking-screw *E*, and carrying at its other end an adjustable rule *F*, which is held frictionally by a concealed spring, and is locked in position by the clamping-nut *G*.

To enable the position of the drill spindle to be determined, a pointer *H* is attached to the thrust block *J*.

It will be clear that this simple device not only acts as a rigid depth-stop, but also allows the depth of drilling to be accurately set from the adjustable zero position of the rule.

Construction

The only machining operation required on the drill-head is to drill and tap the hole to receive the pillar *A*; and as shown in the drawing, Fig. 7, this hole lies $\frac{1}{16}$ in. from the centre-line of the spindle.

To mark-out this dimension, the simplest method is, perhaps, to employ a compass device of the form shown in Fig. 6.

This consists of a pivot member formed of $\frac{1}{2}$ in. diameter round material to fit the spindle bearing and cross-drilled to carry a bent scriber which is secured in place with a set-screw.

After the scriber point has been set with a rule at a distance of $\frac{1}{16}$ in. from the periphery of the pivot member, the latter is inserted in the

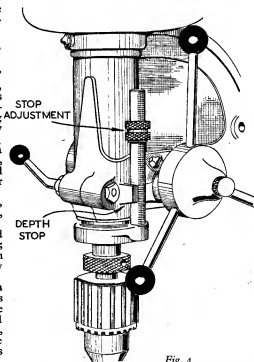


Fig. 4

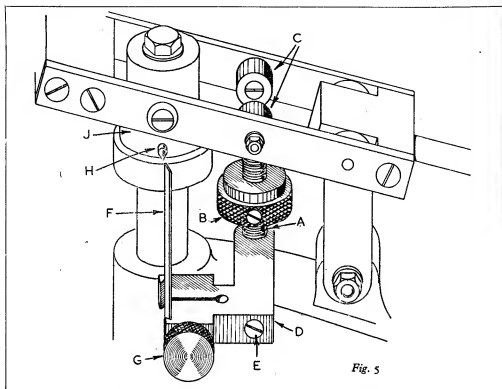


Fig. 5

spindle bearing and the centre-line of the pillar is marked-out.

This dimension line can, of course, be marked-out by mounting the drilling-head on its column

The cross centre-line is scribed with the jenny calipers in the centre of the web of the casting. As the hole into which the pillar screws lies on a curved surface, it is spot-faced with a pin drill.

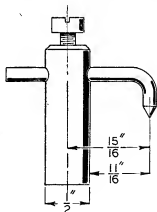


Fig. 6

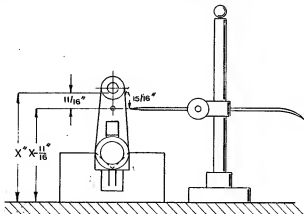


Fig. 7

and supporting the latter in V-blocks on the surface plate, as illustrated in Fig. 7; the height of the lower surface of the spindle is then measured with a ruler, and the scriber of the surface gauge is set to this height less $\frac{1}{16}$ in. to mark-out the centre-line of the pillar,

In the first place, the site of the hole should be heavily indented with a centre punch to give a good bearing for the small centre drill, used to locate the $\frac{1}{8}$ -in. drill which forms the hole to accommodate the guide pin of the pin drill.

(To be continued)

The South London Regatta

IN spite of the terrible weather experienced on Sunday, July 4th, the full programme of events was carried through at the South London Regatta at Brockwell Park.

While no spectacular speeds were obtained, several boats put up good performances, Mr. Lines', Orpington, *Blitz* living up to its reputation, but was eclipsed by Mr. Jutton's *Vesta* which, after doing one lap round the pole, leaped two feet into the air, turned a complete somersault and finished the remaining two laps in fine style.

The results were as follows:—

Mr. Vanner (Kent) with *Leda* winning the steering.

Mr. Lines' (Orpington) *Blitz* the Nomination.



Jutton Bros. starting "*Vesta*," which provided the biggest thrills of the day

The 10-c.c. class was carried off by Mr. Cruickshank (Victoria) with *Defiant II*, the 15-c.c. class by Mr. Jutton (Guildford) with his boat *Vesta*, and Mr. Walker (Malden) the 30-c.c. class with *Gilda*.

Members and boats from the following clubs attended: Kent, Malden, Guildford, Blackheath, North London, Orpington and South London.



Above—Mr. J. Cruickshank starting "*Defiant III*" winner of the C class event

Right—Mr. Lines starting "*Blitz II*"

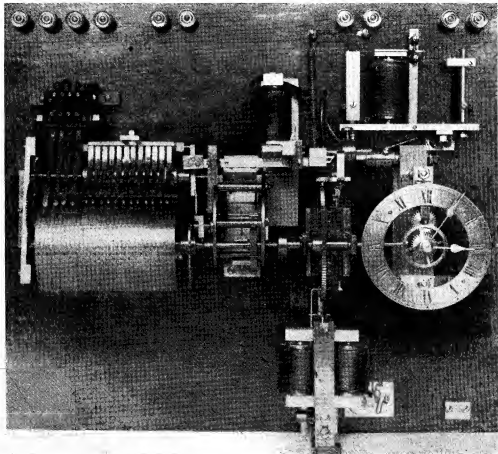


IMPROVED ELECTRIC CHIMES

by H. Stocker Harris

ABOUT 1922, I finished making a "Syn-chronome" electric clock and fifteen dials, and toyed with the idea of making a set of chimes to work in the circuit, as described in the book *Electric Clocks and Chimes* published by Percival Marshall & Co. Ltd., but decided that unless one could do away with the loop of celluloid 4 ft. 6 in.

In place of the cinema sprocket I used a drum $2\frac{1}{2}$ in. in diameter and 3 in. long. This was covered with a sheet of celluloid and the quarters were punched on the left and the hours on the right, Fig. 1. The drum revolves once an hour and the chiming is repeated at quarter, half, three-quarters, and the hour. Then the striking



in length hanging outside the case, I should dislike the whole box of tricks; also, the timing mechanism of the hour strokes was quite uncertain and was bound to vary, especially as the hours had to be punched twelve times in the strip of celluloid.

The solution of the first fault was to use a large drum on which one could punch the complete chimes for the hour and also have room for twelve rows of holes for the hour strokes.

of the hour comes into action. The holes for the hour strokes are arranged in vertical columns, and over each column is a hinged rod terminating in a $3/32$ in. steel ball and pressed down on the drum by a piece of watch spring.

Immediately above the drum is a roller with twelve facets arranged in spiral—these facets are just deep enough to let the rods drop so that the balls make contact with the drum, Fig. 2. At the left-hand end of the drum are gear wheels which

bring the facets in position in turn so that at one o'clock the first facet lets the bar make contact with the drum and the clock strikes one. By the time the drum has made a complete revolution, the second facet is in position to let the second arm down and the clock strikes two, and so on till twelve o'clock when the cycle is repeated.

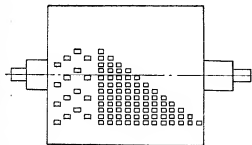


Fig. 1

The roller is insulated by an ebonite bush at each end and is driven by gearing from the drum which has a six-toothed pinion, meshing with a seventy-two-toothed gear wheel and two forty-toothed idlers.

Instead of the hour stroke starting at a variable time as in the original design, I fitted two cams at the hour position—the first actuates the hour chime half a minute before the hour; the second, Fig. 3, actuates the release exactly at the hour or within a small fraction of a second. This interval depends on the closeness of the setting and is constant. In my outfit the interval is about $\frac{1}{4}$ sec., and is due to the inertia of the drum.

Using the big drum did away with the necessity of a gear reduction, and one can use a 120-tooth wheel.

The small star wheel I used gave a very short contact which was overcome by the use of a long flexible spring, Fig. 4. This gives a big rise at A and the contact at B is maintained until the cam at A has fallen back to its position of rest.

The celluloid cover of the drum has now been in continuous use for twenty-five years and has

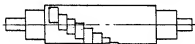


Fig. 2

not been renewed, and the original steel balls are in use.

On the chime section I use platinum contacts—they get so much more work.

As will be seen from the photograph, I have fitted a dial driven by bevel wheels from an extension of the main shaft.

There is no need to approximate the hour holes as described in the original article, as the spring is always under tension, and a quarter of a revolution more or less makes no appreciable difference in the speed of the drum.

In addition to striking the hours on the chime set, I have also, by means of a relay, made a

converted lantern clock in the drawing-room strike the hours.

The striking mechanism of the chimes are old telephone relays rewound and altered so as to give a free hammer stroke. I learned the method of suspending the chime tubes from the former owner of the Croyden Carillon works. In order

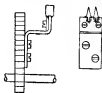


Fig. 3

to get a clear note on the open tube it must be struck at a node—this node would mean having the hammers at varying distances down the tube according to its length, but by fitting a "Tone-bar" at the top of the tube you can then hit all the tubes at the same spot, i.e., at the top of the tube where the tone-bar is inserted.

The bar in question is a disc of metal firmly hammered into the tube just below the holes through which the suspension string passes.

I utilised the works of an old French clock for the main drive but the rest of the spur and bevel wheels were cut on a $2\frac{1}{4}$ -in. Adams lathe.

The mechanism is in a dust-proof case and there are two switches—one cuts out the chimes from

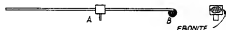


Fig. 4

the circuit and the other stops the chiming but lets the dial continue to function.

After completing the chimes and taking the photograph, I found that the bearing of the main armature was not satisfactory, so I replaced the thin pin by a $\frac{1}{16}$ in. steel rod, coned at each end and engaging a hardened steel screw bored to fit the rod, and fixed in position by means of lock-nuts.

The screws were fixed in the upper limbs of a "Y," making a strong trunnion bearing.

My case was a hinged front, but if I were making another I should most certainly make it with detachable hinges so that one could remove it completely when making any adjustments, as the case is very much in the way at these times.

The striking mechanism of the tubes is hidden by an oak canopy and the steel tubes are lacquered.

The whole took the best part of two years of my spare time, after I had finished seeing patients, and very often kept me up to the small hours of the morning.

Mr. Hope-Jones, the inventor of the Synchronome system, called to see me one day and was very taken with the chimes.

After twenty-five years' constant use, they function with unflinching regularity and are a great joy to the maker.

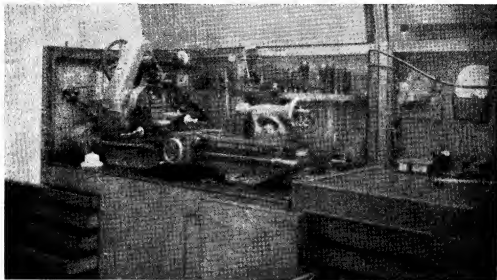
A Cabinet Workshop

by J. Cruickshank

THE constant changing of residence, involving the dismantling and re-erection of the workshop, eventually compelled me to build the two work cabinets shown in the photographs, the left-hand one in 1939, and the other in 1945. They are both constructed as follows: Frame-

Black and Decker 6-in. bench grinder stands at the extreme right end and again is portable. A hole in the bench provides fixing for either a 4-in. or 2½-in. vice, according to requirements.

For ease in cleaning, only a few hand tools are hung in a rack at the back of the tail end of



The "machine shop"

work is of 1½ in. square deal, glued and dowelled where necessary. The left hand cabinet is panelled with 6-mm. five-ply, and the right one 5-mm. three-ply. The panels are pinned and glued on to the outside of the framework, with rounded mouldings, on all corners. They are both 4 ft. long and 21 in. deep. The bench on the left is 30 in. high, while that on the right is 32 in. Total height of both when closed is 4 ft. They are both self-contained, the left one having a let-down flap at its right end, while the other has its flap at the left-hand end. When the cabinets are used together, as shown, both flaps are removed and stored away. A Myford heavy duty lathe, the ML7, is installed on the left. It is a joy to use and fully compensates for taking up "half of the workshop." It has, I think, a lot of influence in my preference for carving bits and pieces from the solid in lieu of using castings. The bench is low enough to give just sufficient height for the lathe counter-shaft when the "bonnet" of the cabinet is closed.

On the right-hand bench is stored the ½-in. Champion drilling machine and ¼-h.p. motor mounted on a portable baseboard, the whole being pulled forward in position for use. A

the lathe. All other tools, equipment, and materials are stored as follows:

Firstly, left-hand cupboard.

No. 1 Drawer—Lathe turning tools.

No. 2—Special drills, end-mills, slitting saws, and gear cutters.

No. 3 Drawer—General tools, spanners, pliers, screwdrivers, etc.

No. 4 Drawer—Measuring tools, micrometers, and calipers, etc.

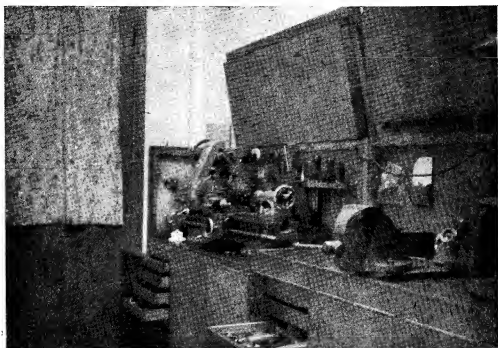
No. 5 Drawer—Complete range of "M.E." taps and dies, also brass thread taps and dies.

No. 6 Drawer—Set of standard parallel reamers, ¼-in.-½ in., adjustable ones ⅝ in. to ¾ in. Various D bits.

No. 7 Drawer—Rarely used lathe tools and large drills.

Below these drawers, on the base of the cabinet, is a rubber mounted concrete block on which the motor was mounted in the days of a 3½-in. Myford.

The second drawer from the left opens on to a single shelf, dividing this compartment in half, vertically. On this shelf a set of cardboard boxes (for quietness) hold the usual selection of B.A. screws and nuts, lapping equipment and various "jobs" awaiting attention. The base shelf



Situated in the entrance hall of a flat, with the main door in the background. (Ladies please note)

holds heavy lathe equipment like verticle slide, dividing head, chucks, etc.

The third door from the left, when opened, shows seven drawers used as follows: Top, silver-steel, round steel stock, round brass stock, round dural stock, assorted lathe and machine tools, and electrical bits and pieces. In the 6-in. deep bottom drawer is stored paraphernalia in connection with my model car racing.

The next door opens to one shelf on which stands a small electric grinder, fitted with black parting wheel for sharpening drills and taps, surface plate, more small cardboard boxes for odds and ends, and the two bench vices. A deep drawer at the bottom holds all my power boat paraphernalia.

The right-hand door reveals five fairly deep drawers which numbered from the top house the following items:—

- 1.—Wood-working tools.
- 2.—Assorted metal tubing.
- 3.—Lathe accessories.
- 4.— " " "
- 5.—The inevitable junk box.

Without shame, I refer to the portable lamp which will hook anywhere along in the gap of the "bonnet" hinge and gives every satisfaction.

A power plug is fitted at the rear, centre, in which the drilling machine, grinders or other electrical tools are plugged.

Both cabinets are varnished in clear Copal.

For the Bookshelf

Railway Memories, by Rixon Bucknall and Dr. Tice F. Budden. (Published by the Authors at 48, Woburn Place, London, W.C.1.) 248 pages, size 5½ in. by 7½ in. Price 15s.net.

Many of our older readers will probably remember the splendid railway photographs of Dr. T. F. Budden, which first came into prominence in the late 1890's and early 1900's. For many years, those photographs were unrivalled for technical excellence and pictorial attractiveness. It was one of Dr. Budden's pictures which won THE MODEL ENGINEER Railway Photography competition in September, 1902.

This book contains reproductions of more

than two hundred examples of Dr. Budden's work, arranged according to the accepted order of importance of the railways of England and Scotland, prior to the grouping. Printed on art paper, these reproductions are excellent, frank in their appeal to the older reader and instantly revealing to the younger generation; moreover, they can be a source of inspiration to the model-maker. Mr. Bucknall has provided a brief but informative preface to each group of pictures, and a descriptive caption for each reproduction. It is a book that can scarcely fail to delight the reader at any time, even when he has become thoroughly familiar with the contents.

A "MIDGE" FROM DERBY

by W. M. Smith

THE three photographs reproduced herewith show a $7\frac{1}{2}$ -in. gauge "Midge," recently completed and tested under steam.

The construction follows the prototype reasonably closely, the cab particularly is as the original design. The prototype was later modified to a type having rounded roofs at the top sides. This

stays are $\frac{1}{4}$ in. \times 40 t.p.i. screwed copper rod, suitably nutted. The boiler was tested to 180 lb. per sq. in. and lagged with 22-s.w.g. copper and asbestos, the working pressure being 80 lb. per sq. in. A "Pop" safety-valve looks after this.

Two water-pumps are fitted; one works off an eccentric on the leading axle, the other is a

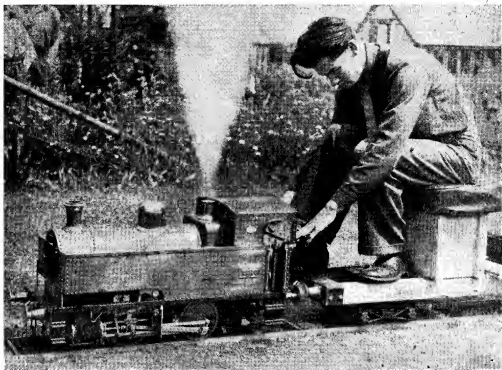


Photo by]

"Midge" on "initial trials"

[W. M. Smith

seems favourable to most builders of this small engine. It is rather strange that the earlier type of roof with the overhanging rain-drip guard rather favours the more modern design in general.

The cab and side tanks are made from 16-s.w.g. polished copper, suitably $\frac{1}{8}$ in. brass angled and copper riveted.

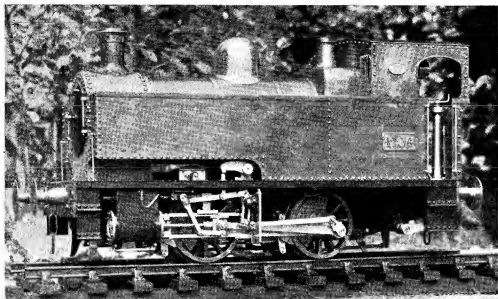
The boiler is wholly constructed of $\frac{1}{4}$ -in. copper with the exception of the rear tubeplate. This is built up to $\frac{1}{2}$ in. thick around the sections where tubes fit by brazing to it, on the firebox side, an additional thickness of $\frac{1}{4}$ -in. copper plate. There are 15 tubes in all, $\frac{3}{4}$ in. outside diameter, no superheater being fitted. The boiler is silver-soldered throughout with the exception of the firebox which is brazed. All

hand emergency pump. The latter can partly be seen in the photograph to the left of the forward bunker and is operated by a handle which screws into the top of the vertical rod attached to the pump. This can be seen close to the pressure-gauge. The pump handle, of course, protrudes a convenient distance through the space intended for the rear spectacle plate. This and a sliding door which normally fits in the rear bunker are removed for driving and firing purposes.

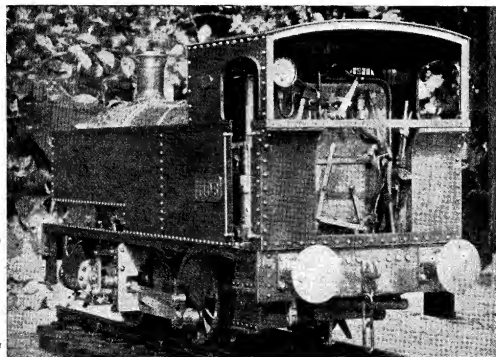
A water injector is fitted and works satisfactorily.

The boiler backplate has the usual fittings, all steel parts being in stainless material, including the two water-gauge plug-cocks.

Cylinder drain-cocks are fitted, and operate from a single control in the cab.



"Midge" shown on assembly track



Photos by]

Showing chiefly the driver's concern!

[W. M. Smith

There are two force-feed cylinder lubricators, one on each footplate, and deliver oil to each valve chest via clock-valves screwed thereon. Each lubricator is operated through a ratchet-lever from a valve-rod guide. This to me seems the ideal drive, as obviously when the engine is running in full gear and, therefore, delivering its maximum power, the valve-rod guide movement is at its greatest and imparts a greater movement to the ratchet-lever, which in turn gives a greater supply of oil to the cylinders when it is most needed. Under lighter engine loads, when the valve-gear is nearer the mid-position, the valve-rod movement is less, thus causing a smaller but sufficient supply of oil.

Immediately over each cylinder valve chest is a removable panel; these normally fit flush with the top surface of each footplate, but they ensure easy removal of valve-chest covers for

inspection of valve settings, also making the snifting-valves accessible.

Running the engine has been confined to a 100-ft. length of track. Unfortunately, I have a gradient of 1 in 40 to contend with. Nevertheless, a load of half a ton appears to require no great effort, and is as much as I can accommodate on my one-and-only truck.

One of the photographs shows "Midge" under steam, my son being on the "footplate."

You will see, the track is definitely austerity, no wood being available for sleepers.

The rail consists of 1-in. \times $\frac{3}{4}$ -in. mild-steel in 12-ft. lengths, with distance-pieces, $\frac{1}{2}$ -in. diameter \times $7\frac{1}{2}$ in. long, drilled and tapped $\frac{1}{8}$ in. diameter at their ends and secured by set-screws passing through the rail section at intervals of 2 ft.

Club Announcements

The Oldham Society of Model Engineers

We have continued, during the past few weeks, to make progress in our efforts to further the cause of model engineering. Indoor meetings included a very fine film show by the Carborundum Co. Ltd.; a demonstration of a novel low lamp; a discussion on the operation of a local ancient beam engine with very divergent theories emerging; a chat on the reasons for the design and modifications of a diminutive hydroplane, and a most interesting evening by T. Tasker on "Synthetic Textiles in Relation to the Model Engineer."

Outdoor meetings included another visit to the Watt's engine (which we appear to have adopted), joining with our fellow travellers at Heston Park and Bolton, and viewing possible venues for a club regatta.

Future events:—

September 10th. Mr. K. Howard, "Building a Lathe."
September 24th. "More Mental Meanderings of a Mech." (F. Miller).

October 8th. J. Binnie, "Armoured Vehicles."

These Friday night meetings are at King Street Co-operative Society, Room No. 3, at 7.30 p.m. All visitors are welcome. Congratulations to Southport on their good start.

Hon. Secretary: F. MILLER, 25, Eric Street, Oldham, Lancs.

Salisbury and District Model Engineer Society

The first exhibition to be organised by the above society and held on July 17th was an unqualified success.

The official opening was performed by Admiral Sir Gerald Dickens, K.C.V.O., with the Mayor of Salisbury in the chair. Over 150 models were on show, including many aircraft, locomotives of all gauges, steam stationary engines, tractors, cranes, yachts, speedboats, ships and i.c. engines.

Of particular interest were the demonstrations of the "Tintometer"—a scientific instrument for measuring colour which is manufactured locally. Other noteworthy exhibits were a new Myford M.L.7 lathe and accessories, a magnificent scale *Queen Elizabeth* by Mr. Perrier, a display of race cars, a beautiful model of a clipper ship, some of the excellent "OO" gauge locomotives made by Mr. Sewell, Mr. Wicks' model-winning showman's tractor, and a perfectly finished 2.5-c.c. petrol engine made from the solid by Mr. H. Scamell.

There was plenty of motion—the running of petrol and compression-ignition engines was demonstrated; Mr. Wicks' tractor and several other engines were in continual operation under compressed air. The junior members were responsible for a model railway layout. Outside the hall, Mr. Lillingston's 7 $\frac{1}{2}$ -in. gauge "King Arthur" was hauling a full load of passengers from 10.30 a.m. to 5.30 p.m. when rain stopped operations.

The hall was crowded until the close at 9 p.m., nearly 2,700 people attending and over 1,100 rides were given on the model railway.

The exhibition aroused a great deal of interest, and many congratulations were received on the excellent show of models. It is hoped that the publicity will result in an increased membership and, consequently, increased activities, and in further support towards our aim of a larger clubroom and workshop, and the construction of a race track, boating pond, and outdoor railway track.

Thanks are due to all those who made the exhibition a success, and especially to the other societies in the Southern Federation who loaned models, and to the members of the Andover Society who, besides loaning models, helped immensely at the exhibition.

Hon. Secretary: K. A. READ, 7, De Vaux Place, Salisbury.

York and District Society of Model Engineers

The next meeting will be held at No. 12 Room, Co-operative Hall, Railway Street, York, on August 14th, at 8.30 p.m., and will be an open night.

All members please note that meetings are held on alternate Saturdays.

Hon. Secretary: W. SHEARMAN, 28, Terry Street, York.

The Southern Federation of Model Engineers

The Andover, Fareham and Portsmouth Societies are all participating in Andover's Grand Carnival Week, August 29th-September 5th, and anyone visiting the town will be welcome to a ride on the railway, a visit to a combined engineering, aero and camera show or to the Fareham and Portsmouth racing car and controlled-flying demonstration on September 5th.

Hon. Sec.-Treasurer: R. PEMBLE, 14 Weyhill Road, Andover.

Southeast Calling Local Clubs

The Southend Model Engineering Club is holding an exhibition during the Southend Carnival Week, August 23rd to 28th, and would be grateful if any club prepared to lend models for this purpose would get in touch with the Hon. Secretary, P. B. LEE, 2, Chalkwell Bay Flats, Undercliff Gardens, Leigh-on-Sea.

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Readers desiring to see the Editor personally can only do so by making an appointment in advance.

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